Editorial

Francisco J. Campa* and Naiara Ortega

Department of Mechanical Engineering,
University of the Basque Country,
Alameda de Urquijo s/n – 48013 Bilbao, Spain
Email: fran.campa@ehu.eus
Email: naiara.ortega@ehu.eus
*Corresponding author

Biographical notes: Francisco J. Campa received his MSc in Mechanical Engineering from the University of the Basque Country UPV/EHU of Spain in 2003. He has received his PhD in Mechanical Engineering from the same university since 2010, having developed a stability model for the milling of thin walls and floor of aeronautical structural parts. At present, he is an Associate Professor in the Department of Mechanical Engineering of the UPV/EHU teaching mechanics and mechatronics and he has more than 20 contributions to indexed scientific journals. His current research interests are dynamics of mechanical systems and manufacturing processes, machine-tools, robotics and mechatronics.

Naiara Ortega is an Associate Professor in the Department of Mechanical Engineering of the University of the Basque Country since 2011. She defended his Doctoral thesis in 2005 in Electro-Dischage Dressing of Superabrasive CBN Grinding Wheel. Since 2007, she is part of the High Performance Manufacturing Group, headed by Luis Norberto López de Lacalle. From then on, she has been working closely with the aeronautics industry, specifically in the field of EDM and grinding of aeronautical materials with low machinability. She is the main researcher of several R&D projects, from more industrial to more scientific character on precision manufacturing. As a result of her research work, she has 25 publications indexed in JCR.

The aeronautics industry is always promoting continuous innovation and development of new technologies and advanced materials, thus contributing (in a relevant way) to the economic and social development of several countries. Aeronautic sector usually generates wealth and high added value, acting as the motor that boosts other industrial sectors. In fact, any progress achieved in aeronautics is directly transferable to other sectors that work with similar components, as for example, gas turbines used in multiple fields such as aeronautics (55%), electric field (20%), mechanics (10%) and others (15%).

Regarding new materials for aero-engine components, numerous components made of materials with special resistance to high temperatures (working temperature greater than 1,050ºC) can be found. Among these materials, Ni, Ti, Co and other alloys can be distinguished, with compositions of multitude of metallic and non-metallic elements that provide resistance to corrosion and wear, while increasing the mechanical properties at high temperatures. The range of materials is very wide and their behaviour under different machining processes is diverse. For this reason, developing new technologies becomes a relevant task.

Some challenges need to be faced, such as machining of superalloys and other advanced materials using new cooling systems and fluids, non-conventional machining processes (EDM, chemical machining, ultrasonic machining and other processes) or advanced welding processes, amongst others. Special mention should be made on laser processes, mainly on the additive manufacturing, a promising manufacturing process which could be the answer that this industry needs.

This special issue covers part of the state-of-the-art in manufacturing processes, metrology and inspection for the manufacturing of components of aero-engines in the next future.